

CLAIMS

1. A hearing aid forming a Noise-Vocoded Speech Sound signal that is obtained by dividing at least one portion of an input sound signal into a frequency band signal and subjecting one of the frequency band signals to noise, and outputting the Noise-Vocoded Speech Sound signal.
2. A hearing aid forming a Noise-Vocoded Speech Sound signal that is obtained by dividing at least one portion of an input sound signal into a plurality of frequency band signals and subjecting the frequency band signals to noise, and outputting the Noise-Vocoded Speech Sound signals.
3. The hearing aid according to claim 1 or 2, wherein
a Noise-Vocoded Speech Sound signal in which a component of a sound source signal is subjected to noise is generated by:
 - extracting a signal with a predetermined frequency band from the sound source signal by a first band filtering portion having a plurality of band filters;
 - extracting an amplitude envelope of each frequency band signal by an envelope extracting portion having an envelope extractor;
 - applying a noise source signal to a second filtering portion having a plurality of band filters to extract a noise signal corresponding to the predetermined frequency band;
 - multiplying an output from the first band filtering portion by an output from the second band filtering portion in a multiplying portion; and

accumulating outputs from the multiplying portion in an adding portion.

4. The hearing aid according to any one of claims 1 to 3, wherein
5 at least one of a number of the band filters for division into frequency band signals and a frequency of a frequency band boundary can be changed at least through language.
5. The hearing aid according to any one of claims 1 to 3, wherein
10 at least one of a number of the band filters for division into frequency band signals and a frequency of a frequency band boundary can be changed through automatic language recognition.
6. A training device outputting a Noise-Vocoded Speech Sound signal
15 that is obtained by dividing at least one portion of an input sound signal into a frequency band signal and subjecting one of the frequency band signals to noise, receiving a response from a trainee and outputting a result as to whether the response is correct or incorrect.
- 20 7. A training device outputting a Noise-Vocoded Speech Sound signal that is obtained by dividing at least one portion of a sound signal into a plurality of frequency band signals and subjecting the frequency band signals to noise, receiving a response from a trainee and outputting a result as to whether the response is correct or incorrect.
- 25 8. The training device according to claim 6 or 7, wherein
 a Noise-Vocoded Speech Sound signal in which a component of a

sound source signal is subjected to noise is generated by:

extracting a signal with a predetermined frequency band from the sound source signal by a first band filtering portion having a plurality of band filters;

5 extracting an amplitude envelope of each frequency band signal by an envelope extracting portion having an envelope extractor;

applying a noise source signal to a second filtering portion having a plurality of band filters to extract a noise signal
10 corresponding to the predetermined frequency band;

multiplying an output from the first band filtering portion by an output from the second band filtering portion in a multiplying portion; and

accumulating outputs from the multiplying portion in an
15 adding portion.

9. The training device according to any one of claims 6 to 8, wherein
at least one of a number of the band filters for division into
frequency band signals and a frequency of a frequency band boundary
20 can be changed at least through language.

10. The training device according to any one of claims 6 to 8, wherein
at least one of a number of the band filters for division into
frequency band signals and a frequency of a frequency band boundary
25 can be changed through automatic language recognition.

11. A game device outputting a Noise-Vocoded Speech Sound signal that

is obtained by dividing at least one portion of a sound signal into a frequency band signal and subjecting one of the frequency band signals to noise, receiving a response from a game player and outputting a result as to whether the response is correct or incorrect.

5

12. A game device outputting a Noise-Vocoded Speech Sound signal that is obtained by dividing at least one portion of a sound signal into a plurality of frequency band signals and subjecting the frequency band signals to noise, receiving a response from a game player and outputting
10 a result as to whether the response is correct or incorrect.

13. The game device according to claim 11 or 12, wherein

a Noise-Vocoded Speech Sound signal in which a component of a sound source signal is subjected to noise is generated by:

15 extracting a signal with a predetermined frequency band from the sound source signal by a first band filtering portion having a plurality of band filters;

extracting an amplitude envelope of each frequency band signal by an envelope extracting portion having an envelope
20 extractor;

applying a noise source signal to a second filtering portion having a plurality of band filters to extract a noise signal corresponding to the predetermined frequency band;

25 multiplying an output from the first band filtering portion by an output from the second band filtering portion in a multiplying portion; and

accumulating outputs from the multiplying portion in an

adding portion.

14. The game device according to any one of claims 11 to 13, wherein
at least one of a number of the band filters for division into
5 frequency band signals and a frequency of a frequency band boundary
can be changed at least through language.

15. The game device according to any one of claims 11 to 13, wherein
at least one of a number of the band filters for division into
10 frequency band signals and a frequency of a frequency band boundary
can be changed through automatic language recognition.

16. A sound output device, wherein
a Noise-Vocoded Speech Sound signal in which a component of a
15 sound source signal is subjected to noise is generated by:

extracting a signal with a predetermined frequency band
from the sound source signal by a first band filtering portion
having a plurality of band filters;

extracting an amplitude envelope of each frequency band
20 signal by an envelope extracting portion having an envelope
extractor;

applying a noise source signal to a second filtering portion
having a plurality of band filters to extract a noise signal
corresponding to the predetermined frequency band;

25 multiplying an output from the first band filtering portion
by an output from the second band filtering portion in a multiplying
portion; and

accumulating outputs from the multiplying portion in an adding portion, and

wherein at least one of a number of the band filters for division into frequency band signals and a frequency of a frequency band boundary can be changed at least through language.

17. The sound output device according to claim 16, wherein

at least one of a number of the band filters for division into frequency band signals and a frequency of a frequency band boundary can be changed through automatic language recognition.

18. The hearing aid according to any one of claims 1 to 5, comprising a sound signal extractor for extracting only a sound component from an input signal,

wherein said at least one portion of an input sound signal is a signal of the sound component extracted by the sound signal extractor.

19. The training device according to any one of claims 6 to 10, comprising a sound signal extractor for extracting only a sound component from a signal,

wherein said at least one portion of a sound signal is a signal of the sound component extracted by the sound signal extractor.

20. The game device according to any one of claims 11 to 15, comprising a sound signal extractor for extracting only a sound component from a signal,

wherein said at least one portion of a sound signal is a signal of

the sound component extracted by the sound signal extractor.

21. The sound output device according to claim 16 or 17, comprising a
sound signal extractor for extracting only a sound component from a
5 sound signal,

wherein the sound source signal from which the first band
filtering portion extracts is a signal of the sound component extracted by
the sound signal extractor.